

A Knowledge-Acquisition Wizard to Encode Guidelines

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An important step in building guideline-based clinical care systems is encoding guidelines. The encoding process entails gleaning clinical knowledge out of paper guidelines, using a guideline model to encapsulate the knowledge in a computable formalism, and building a guideline knowledge base. Protégé-2000 [1], built in our laboratory, is a general-purpose program that facilitates building knowledge bases. Most guideline-encoding groups such as EON, InterMed, Prodigy, and SAGE use Protégé-2000 to specify the guideline models. Domain specialists then enter guideline knowledge using GUI forms that Protégé-2000 automatically generates based on the guideline model.

Knowledge-Acquisition Wizard

We have built a knowledge-acquisition wizard as an extension of Protégé-2000 to help the domain specialists in the encoding process. The main goal of the wizard is to create an environment that is more intuitive to domain specialists to enter and review guideline knowledge. The wizard supports two main functions. It hides the complexities of the underlying computable knowledge model from the user. It provides intelligent guidance to the user through the knowledge acquisition process.

Customized GUI forms for knowledge-acquisition

The wizard provides a domain-specific view of the knowledge model concepts by employing customized GUI forms. In Protégé-2000, there is a one-to-one relationship between GUI forms and corresponding knowledge model concepts. The wizard facilitates a more domain-specific relationship by allowing logical grouping of concepts into a single form. It also allows a single complex concept to be acquired via multiple forms.

Complex guideline-specific information warrants special visual metaphors for acquiring and reviewing it. The wizard incorporates special-purpose widgets that provide the user more intuitive user interface.

Domain patterns are constructs that encapsulate high-level guideline domain knowledge, and they recur across the domain. The wizard allows the knowledge developer to specify a library of patterns. Patterns can provide a skeletal framework that domain specialists can use when starting to build a knowledge base. Patterns can also correspond to common tasks that domain specialists can plug in.

Intelligent guidance through model-based knowledge-acquisition process

The wizard provides a methodology to specify the knowledge acquisition process as a model of related tasks.

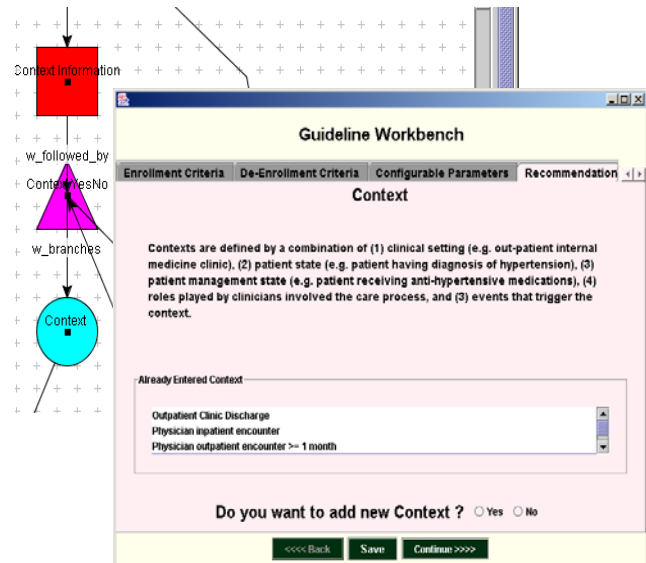


Figure 1. Knowledge-Acquisition Wizard. The knowledge-acquisition process model shown on the left drives the sequence and content of the GUI forms shown to the domain specialist.

The wizard's GUI module will then interpret the process specification to guide the domain specialists step-by-step through knowledge acquisition process. A sequence of custom forms as described in the previous section is presented to the user for knowledge entry (Figure 1). With each form, the user is presented with the form's annotations, examples and any specific knowledge-acquisition instructions. Guideline knowledge is validated for consistency, appropriate type and any other specified constraint as and when the knowledge is entered. The user interface has additional features that aid the user knowing where they are in the guideline encoding process, and knowing when they are done.

Acknowledgments

This work has been supported, in part, by grant from the U.S. Department of Commerce, National Institute of Standards and Technology, Advanced Technology Program, Cooperative Agreement 70NANB1H3049, by grant from the National Library of Medicine LM05708, and by grant from National Cancer Institute.

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